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Studies investigating the level of achievement of intellectually gifted underachieving pupils in the elementary school were made between two groups of underachievers. One group was placed in a class of high achievers (homogeneous) while the other group was placed in a heterogeneous class. It was hypothesized that underachievers in the homogeneous class would be stimulated to raise their level of achievement, would become more creative, and would perceive their peers and parents as being more accepting of them.

Intellectually gifted children in grades two through five were selected on the basis of teacher referrals, group achievement and intelligence tests, and the vocabulary scale of the 1937 Stanford-Binet test. These children were involved in the experiment for two or three years. Nothing was added to the regular curriculum for either group. The measuring services used were the California Achievement Tests, the Perceived Parent Attitude Scale, the California Test of Personality, and two creative ability tests from Guilford. Results showed that the underachieving gifted pupils placed in homogeneous classes made significant gains in approaching their expected level of academic performance. However, higher gains in creativity were only partially supported. Also the hypothesis that these pupils in homogeneous classes would be better accepted by their peers was not supported.

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Champaign Community Unit Schools No. 4
E. H. MELLON, Superintendent
Champaign, Illinois
July, 1962

THE EFFICACY OF TWO ORGANIZATIONAL PLANS FOR UNDERACHIEVING INTELLECTUALLY GIFTED CHILDREN

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Department of Special Services
July, 1962

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The encouragement, approval, and support of research by the Champaign Board of Education, the Superintendent of Schools, Dr. E. H. Mellon, and the Assistant Superintendent of Schools, Dr. Earl D. Patton reflects their recognition that the quality of a school system is contingent to no small degree on the extent to which public schools attempt to solve their crucial problems through research.

This research would not have been possible had it not been for the excellent cooperation of Camille Marien, Principal of Westview School, and Florence Aye, Principal of Dr. Howard School, and their staff of teachers. The level of interest and cooperation of the parents whose children served as subjects in this project was outstanding.

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The findings reported in this publication represent analysis of objective data gathered over a period of three years of a five year longitudinal study. No attempt was made to analyze or include qualitative data included in the detailed case studies on each subject in this project. At the completion of the five year study, the findings of the complete case studies will be incorporated in a more inclusive report. Recognition is given here to members of the research staff who made valuable contributions to the intensive and extensive study of these subjects. Lola Stanley, Consultant for the Gifted, contributed valuable information by administering achievement tests and by obtaining information concerning classroom behavior of subjects by interviewing teachers. Dorothy Durham, Supervisor of Social Work, gave valuable assistance by serving as a consultant to the social workers on the project, assisting in the construction and scoring of the structured parent and child interviews, and by interviewing parents and subjects. Recognition is extended to Lela Costin, social worker, who, during the first year of the project, took the major responsibility for developing and conducting the structure parent and child interviews. William Seim, social worker, contributed by assisting in the establishment of the reliability of the structure parent interview. Donna Ferrier, social worker, interviewed the subjects and parents the last two years of this project.

Merle B. Karnes
Research Project Director and
Director of Special Services

FOREWORD

There have been those who have claimed that intellectual ability comes as the result of some happy but chance combination of genes. At the other extreme, there have been those who have claimed that giftedness in students can be, and always is, produced by manipulation of a learning environment which provides for some rewards or punishments as guides to behavioral change. The orientation of the professional staff in the Champaign Public Schools places them somewhere along the "middle of the road" with respect to this issue. Our people believe in the schools' capacity to, and responsibility for, the fostering and promotion of prestige performances in talented students. At the same time, they recognize that they probably may never be able to produce or develop genius *per se*.

As basic to the acceptance of responsibility for the education of intellectually gifted and academically talented students, the Champaign Division of Special Services embarked upon an experimental fact-seeking series of research studies. In July of 1961 a first report was published with the title, "Factors Associated with the Underachievement and Overachievement of Intellectually Gifted Children." This second report entitled, "The Efficacy of Two Organizational Plans for Underachieving Intellectually Gifted Children", deals in a more practical manner with problems of organizing for formal education. The findings and their implications may be more immediately useful to school systems as research is translated into practice.

There exists in education today only a weak residue of the former grand ignorance of, and disregard for, the stimulating dynamics of research-oriented pedagogy. As a matter of fact, it has become widely recognized that scientific investigation and the educated skepticism

of research provide the best, and virtually the sole, road to creative and tested improvement of instruction and enduring curriculum change. It has become more widely recognized that reports alone of research study and findings, which remain outside the ken of educational practitioners, are woefully barren and fall short of exerting their potential influence on the building and maintenance of powerful educational practice. There is something visceral about understanding and appreciating the infinity of new ideas opened through fearless and uninhibited experimentation and research. The school system which provides opportunities for its personnel to become operationally intimate with research activities on-their-feet, as it were, and in this visceral sense will be in a natural position to make greatly needed contributions to the evolution of a perspective on teaching which aims at maximizing effectiveness in fulfillment of the promise of research investigations and the efficient creative ways of thinking which accompany them.

Earl D. Patton
Assistant Superintendent of Schools

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Appendix

Chapter I

PROBLEM

It is imperat[illegible] for the maintenance and advancement of society that we foster the optimal development of our intellectually gifted so that they will be able to make the unique contribution to society of which they are capable. The welfare of our nation is dependent upon our ability to meet the increasing demands for intellectually capable and highly educated individuals to fill responsible positions. Russell and Cronbach (1958) estimate that if every individual with the high intellectual ability required to graduate from college did so, then we would have approximately 660,000 college graduates per year rather than the actual 270,000 graduates. These authors conclude, "Our scientific manpower problem is not a shortage of talent, but a failure to attract enough students into advanced specialized training."

The failure of the intellectually gifted to develop fully his capabilities must be viewed not only from the standpoint of the loss to society but also from the standpoint of its effect on the individual. Horney (1936) states, "Failing to live up to one's potentialities prevents the individual from attaining self-fulfillment, the self-actualization of which he is capable, and thus prevents his becoming a truly integrated person." A wide discrepancy between potential and achievement in our culture, which places a high value on achievement, can contribute to personality maladjustment.

There is substantial evidence pointing to the fact that a sizeable number of intellectually gifted children are not achieving at a level commensurate with their capabilities. French (1959) noted, "Gifted

children are the greatest underachievers in our schools because their achievement is further below the limits of their capacity than any other group."

Although many schools have moved rapidly in recent years to promote and establish improved programs for the gifted, almost invariably the assignment of gifted pupils to special programs has been based not only on high intellectual aptitude for learning but also on high achievement. This procedure automatically eliminates the gifted pupil who has not demonstrated a correspondingly high level of achievement. Very little has been reported relative to programs or services specifically designed to raise the level of achievement of the intellectually gifted underachievers. The national concern and need for getting the very maximum number of gifted children to achieve on a par with their aptitude for achieving is so great that the schools have a grave responsibility to design and conduct educational programs which will raise effectively the level of achievement of gifted children who function significantly below their aptitude for achieving.

The general problem with which this research is concerned is that of raising the achievement of underachieving gifted children. The specific problem is that of testing two approaches for raising the achievement of gifted children whose present performance marks them as underachievers. One approach is that of placing a small number of underachieving gifted children in homogeneous classes with gifted children who are achieving at a level commensurate with their abilities. Another approach is that of placing underachieving children in heterogeneous classes made up of

children with a wide range of intellectual abilities. Since motivation, habits, interests and attitudes established at an early age tend to affect academic achievement in subsequent years, identification and treatment of young underachievers was deemed to be important. Thus, subjects chosen for the study were intellectually gifted underachievers at the elementary level.

In general, the hypotheses to be investigated in this study state that underachieving intellectually gifted children enrolled in homogeneous classes with high intellectually gifted achievers will be significantly superior to underachieving intellectually gifted children enrolled in heterogeneous classes with respect to academic achievement and creativity. They will, likewise, see themselves as being better accepted by their peers and by their parents.

Chapter II

REVIEW OF RELATED RESEARCH

Relevant Prior Research Studies

Educational Programs and Procedures and Academic Achievement

It has long been recognized that alterations and modifications of the educational program provide an opportunity for enhancing the school achievement of gifted pupils. The findings of these studies have been reviewed extensively by Passow (1958) and by Carter (1960). Schools have utilized, singularly or in combination, enrichment, acceleration, and ability grouping to challenge the gifted pupil to develop his abilities to the fullest. As of now, no administrative plan has proved to be the best approach for meeting adequately various types and degrees of giftedness. Studies comparing gifted pupils enrolled in homogeneous versus heterogeneous classes indicate a tendency for pupils in the homogeneous classes to attain superior academic, personal and social growth benefits. An extensive review of the literature revealed no studies that have dealt directly with the problem of motivating and educating underachieving gifted children of elementary school age by utilizing a plan in which they are placed in special classes with achieving gifted pupils. Gallagher (1957), utilizing a case study approach on exceptionally bright underachieving and achieving elementary school children, noted that gifted children placed in classrooms with few or no intellectual equals did not seem to progress as well academically and had more social acceptance problems in the higher elementary grades.

The findings of his research further suggested that the schools might wish to re-evaluate the benefits and debits derived from heterogeneous grouping.

Measures of Ability and Achievement

The relationship between measures of ability and school achievement has been widely investigated. The studies have consistently found a correlation of about +.55 between IQs and achievement test scores (Fishman and Pasanella, 1960). If we assume that this general relationship between measures of ability and achievement scores holds for gifted pupils as a group, the reported correlation accounts for only a small amount of the variance (15 to 20 per cent) contributing to their educational achievement. These observations suggest that the gifted pupil's capacity for making effective use of his intellectual ability is influenced by a number of factors other than intellectual ability.

Parental Attitudes and School Achievement

The attitudes of parents, which may be favorable or unfavorable toward educational achievement, have been studied as a factor associated with differential academic achievements. In a study comparing parent-child relationships of high and low achieving female pupils, Drews and Teahan (1957) noted that mothers of high achieving subjects, when compared with mothers of underachieving subjects, were found to be significantly higher on measures of dominance and significantly lower on measures of ignoring. The parents of high achieving pupils set high levels of aspiration. High achievers seemed to have a strong identification with their parents and to adopt the high aspirational levels which their parents set for them. The Champaign study (1961) investigating the factors associated with

underachievement and overachievement of intellectually gifted elementary age pupils found that parents of high achievers were more accepting of their children than were the parents of underachievers, according to an analysis of detailed case studies. In addition, statistical analysis of data obtained from a standardized parent attitude scale revealed that fathers of overachieving gifted pupils were significantly less hostile-rejecting than were fathers of underachieving gifted pupils. Likewise, Walsh (1956), using a play therapy approach to obtain information on underachievers and overachievers, concluded that low achievers perceived themselves as less well accepted by their families than did overachievers. Terman and Oden's research (1947) indicated the importance of parental attitudes which can stimulate or impede the child's development of independence, self-reliance, self-confidence, and desire to excel. Terman's most successful adult subjects were rated more favorably on the above traits than were the least successful adult subjects. Differences on these traits were evident even in childhood. The above studies suggest that parental attitudes can play a definite role in contributing to underachievement among gifted pupils.

Regardless of such factors as impaired parent-child relationships, perhaps there is something that the school can do to foster improved achievement. Possibly if achievement can be accelerated, parents will be more accepting of the child and thus improved acceptance will stimulate or motivate the child to put forth greater effort.

Social Status and School Achievement

Since the setting in which school learning occurs is a group situation, social status and patterns of social relationships have been investigated as factors contributing to good or poor school achievement. In an analysis of the processes involved in social learning, Festinger (1954) discussed the part played by group membership in regulating the performance of a group member. He noted that status and membership in a group is contingent upon adherence to the norms or standards which are held by the group and that persons will ordinarily compare and contrast their performance with that of persons of the same level of ability or achievement. From these observations, the social status and social relationships of a pupil would appear to be closely associated with his academic achievement since academic achievement is one of the more apparent standards for recognition and acceptance as a class member. In a special class made up predominantly of high achievers, it may well be that the underachievers placed in such a class will accept the achievement standards of this peer group and thus this administrative plan may facilitate improved academic achievement.

Investigations of the social status of gifted pupils have shown that, as a group, these pupils enjoy greater social acceptance than do pupils of average ability. It is not clear, however, whether this status accrues from their high intellectual ability or from the possession of superior social skills (Gallagher and Crowder, 1959; Terman, 1925). In his follow-up studies of gifted subjects, Terman concluded that one of the greatest differences between his most successful and least successful adult subjects was in all-around social adjustment. The social position of underachieving gifted pupils has not been widely investigated. In a study conducted by Kurtz and Swenson (1951),

"Plus Achievers" were found to have better peer relationships than did a comparable group of "Minus Achievers". The Champaign study (1961) on underachievers and overachievers indicated that the overachievers tended to perceive themselves as having more peer acceptance than did their underachieving classmates.

Creativity and Academic Achievement

Interest in the structure of intellect has led many investigators to explore the realtionship between general intelligence, academic achievement and creativity (Getzels and Jackson, 1958; Torrance, 1959; Champaign Schools study, 1961). Their findings indicate that creative ability is significantly related to achievement and suggest that creativity is another dimension of giftedness and that there should be exploration of the types of administrative plans which may help foster both academic achievement and creative ability.

Implications of Prior Research for the Present Study

The intellectually gifted pupil has been recognized as presenting challenging educational problems. Although a number of significant studies have concerned themselves with the educational achievement of this group of pupils, there is no inclusive theory or model for integrating the major findings reported from such investigations. It is acknowledged that, as a group, the gifted pupils have higher academic achievement than do pupils of average ability, but there have been few systematic attempts to investigate ways of promoting improved achievement among gifted pupils who are not achieving at a level commensurate with their intellectual potential. The degree of academic underachievement of the gifted becomes more apparent when the percentage of such pupils who complete training

for the more demanding positions in our society is considered. For example, only about one in three of the pupils who have the ability to complete advanced training do so (Wolfle, 1960). The failure of these pupils to pursue training preparing them for needed technical positions essential to the welfare and maintenance of our social order may be associated with such motivational factors as attitudes toward academic achievement, interest in academic endeavors, and misconceptions regarding their real potential.

Another problem evident in the studies of the school adjustment of intellectually gifted pupils is the lack of appropriate measuring devices for identifying these pupils and for evaluating factors which may be associated with differential academic outcomes achieved by these pupils.

The studies on underachievement have used primarily older subjects. Little research has concentrated on elementary age gifted pupils who are underachieving. Although it may be less complicated to identify older underachievers, many of the factors contributing to underachievement are operative during the elementary years. Gowan (1957) stated, "There is considerable research evidence to indicate that achievement both in high school and later stems from habits, interests, attitudes, and motivation established in elementary school. With gifted children, these latter factors seem to be facilitated by special curriculum adjustment." It would appear that early identification and remediation for young underachievers are indicated. To postpone educational treatment until the underachiever has reached the secondary school may not prove to be fruitful.

There is also the possibility that the underachieving gifted pupil may be overlooked when group measures are used to identify gifted pupils.

Measures of the achievement of gifted pupils as a group may be influenced spuriously by "ceiling" or "floor" effects if inappropriate levels of achievement tests are administered. Grades and teacher observation have, likewise, proved inadequate for identifying the underachieving gifted. Such possibly relevant variables as parental attitudes, peer relationships, and creativity have received relatively little attention as they relate to underachievers in different educational programs. The efficacy of such educational alterations as changes in teaching methods, instructional materials, administrative procedures, and special teachers, which may influence academic achievement of the underachiever has not been explored systematically.

In a study of factors associated with the underachievement of gifted pupils, the subjects should be identified at an early point in their school experience and on the basis of individual assessment of their learning ability. Level of intellectual ability, socio-economic background, sex, and racial origin should be carefully controlled in comparing differences between groups of intellectually gifted pupils.

When the schools attempt to help intellectually gifted pupils achieve at a level commensurate with their intellectual ability, some consideration should be given to understanding what changes may take place with respect to other important variables associated with achievement. It would seem imperative that the school make provisions for facilitating the optimal development of the potentials of the underachieving gifted pupil. Since creativity, peer relationships, and attitudes of parents seemingly are important factors contributing to academic realization, it would appear paramount that investigations be made to evaluate the efficacy of various administrative plans upon these factors as they influence improved academic achievement among underachieving intellectually gifted pupils.

Chapter III

THEORETICAL ORIENTATION

Degree of Stimulation and Development of Intellectual Potential

It has been demonstrated that the development of learning ability or intellectual capacity is influenced by the degree and nature of the stimulation experienced (Skodak and Skeels, 1949; Kirk, 1958). It is not clear whether the changes associated with stimulation involve alterations in the basic potential for learning or in the total capacity of the individual for making use of his specific intellectual potential. Nevertheless, the relationship is such that the development of learning ability is maximized by exposure to those situations in which there is an abundance of stimulation. The development of learning ability is minimized when the individual is subject to situations in which there is a minimum of stimulation. The child's development is influenced by stimulating experiences at home and in the community, but within our culture, the school is recognized as being especially concerned with providing experiences for fostering the development of intellectual ability.

Factors Influencing the Degree of Stimulation in the Classroom

The school holds the following significant sources of stimulation: (1) a variety of instructional materials and equipment designed to favor intellectual development; (2) groups of pupils who provide a concentration of ideas, interests, goals and associations which may serve as a source of inspiration; and (3) teacher functioning both as sources of additional ideas and interests and as agents encouraging the pupils to interact with and profit from the ideas and activities in the classroom.

The actual degree of stimulation available in a classroom is dependent upon the nature of the teaching materials available, the characteristics of the pupils who comprise the class, and the effectiveness of the teacher in promoting the personal involvement of the pupils in the goals and activities of the class. The greater number and higher quality of interests, ideas and concepts which, according to Terman (1925), characterize the intellectually gifted pupil as compared to the pupil of lesser intellectual ability renders classrooms made up predominantly of intellectually gifted pupils potentially more stimulating than classrooms in which there is a paucity of pupils of higher intellectual ability. Although it is recognized that the effectiveness of individual teachers will vary, other things being equal, the teacher who works with pupils who, as a group, present a uniformly high degree of conceptual ability will be able to hold high goals and expectations consistent with their advanced mental maturity. The teacher who works with pupils who, as a group, present a lesser degree of conceptual ability will be confronted with having to hold to lower goals and expectations compatible with the potential of such a group of pupils.

Relationships Between Degree of Stimulation and Performance

When pupils of comparable degrees of intellectual ability are subjected to classroom situations presenting different possibilities for stimulation, the influences accruing from these different degrees of stimulation will be reflected in the performance of the pupils. The pupils in a more stimulating classroom will have higher academic achievement whereas the pupils in a less stimulating classroom will have lower academic achievement. In an analysis of group behavior, Festinger (1954) discussed the part played by group norms in contributing to the

quality of performance evidenced by the group members. The pupils in a classroom composed predominantly of pupils of high intellectual ability will be under pressure to attain the comparatively high academic standards and goals held by this group. In a classroom made up of pupils who, as a group, present the possibility of a wider range of standards and goals, there is more choice of sources for the group members to use in judging their performance. The academic achievement of pupils in such a heterogeneous grouping may be either high or low, reflecting the greater range of standards and goals prevailing in their classroom group. Since the teacher working with a group of pupils who have varying degrees of intellectual ability is likely to hold to goals and expectations which represent an average of the group, the academic achievement of pupils in such a group may reflect these same average expectations.

Academic performance would be expected to be the one measure most sensitive to changes in a pupil's capacity for making use of his learning ability as a result of the influence of the degree of stimulation prevailing in the classroom. Such other dimensions as creativity, peer relationships, and parent-child relationships would be expected improve, but standings in these respects, though positively correlated, would vary according to the intellectual demands of the task and according to the relevance of the accomplishment to the norms and standards held by the classroom group. Therefore, the gifted underachievers placed in the more stimulating environment of homogeneous classes with high achievers would be expected to manifest greater improvement in achievement, creativity, acceptance by peers, and acceptance by parents than would underachievers placed in the less stimulating environment of the heterogeneous classes comprised of pupils with a wide range of intellectual abilities.

Chapter IV

OBJECTIVES AND HYPOTHESES

When the educational achievement of intellectually gifted pupils is compared with individually ascertained measures of their intellectual ability, some gifted pupils are found to have academic achievement which is much below the expected level. The formulation of appropriate educational programs to remedy the underachievement of intellectually gifted pupils presents challenging problems for educators. It is suggested that when a small number (20 per cent) of underachieving intellectually gifted pupils are placed in homogeneous classes with achieving intellectually gifted pupils (80 per cent), they will be stimulated to increase their rate and level of academic achievement significantly more than when underachieving gifted pupils are placed in heterogeneous classes. They will likewise be more creative and perceive themselves as being better accepted by their peers and parents.

The following hypotheses were tested in this study:

1. Underachieving gifted pupils enrolled in homogeneous classes make greater academic gains relative to expectancy than do underachieving gifted pupils enrolled in heterogeneous classes (underachieving gifted pupils placed in homogeneous classes make greater gains in approaching their expected level of academic performance in reading and arithmetic than do underachieving gifted pupils placed in heterogeneous classes).

2. Underachieving gifted pupils enrolled in homogeneous classes make higher gains in creativity than do underachieving gifted

pupils enrolled in heterogeneous classes (underachieving gifted pupils enrolled in homogeneous classes make greater gains on measures of creativity than do underachieving gifted pupils enrolled in heterogeneous classes).

3. Underachieving gifted pupils enrolled in homogeneous classes manifest greater gains in perceived acceptance by others than do underachieving gifted pupils enrolled in heterogeneous classes (underachieving gifted pupils in homogeneous classes make greater gains on the Perceived Peer Relationship Scale than do underachieving gifted pupils enrolled in heterogeneous classes).

4. Underachieving gifted pupils enrolled in homogeneous classes manifest greater gains in perceived parental acceptance and intrinsic valuation than do underachieving gifted pupils enrolled in heterogeneous classes (underachieving gifted pupils in homogeneous classes make greater gains on the Perceived Parent Attitude Scale than do underachieving gifted pupils in heterogeneous classes).

Chapter V

METHOD

Subjects

The subjects for this investigation were drawn from a pupil population of approximately 840, consisting of all pupils in attendance at two large elementary schools serving comparable and adjacent upper-middle class socio-economic areas. Preliminary screening, made on the basis of scores on the California Test of Mental Maturity, California Achievement Tests, a vocabulary scale, and teacher ratings (making use of a check list of characteristics of gifted children), identified 465 pupils who would be in grades 2, 3, 4 and 5 and who gave indications of being of better than average intellectual ability. This screening was carried out in June, July and August of 1959. The 1937 Stanford-Binet Intelligence Scale was administered to the 465 potential subjects. Appropriate forms of the California Achievement Tests were also given.

Approximately 27 pupils at each of the four grade levels in each of the two elementary schools (N 223) were found to have Stanford-Binet IQs of 120 or higher. Individual grade placement scores in the areas of arithmetic and reading of these pupils were compared to Horn formula (1941) corrected values for expected achievement in these areas (Reading = $\frac{2MA + CA}{3} - 5$; Arithmetic = $\frac{MA + CA}{2} - 5$) to obtain achievement discrepancy scores for each pupil. The average achievement discrepancy scores were plotted for each grade level and pupils whose achievement discrepancy was one standard deviation or more below the mean were classified as underachievers.

At the beginning of the 1959-1960 school year, at one school the gifted pupils were in homogeneous classes. At the other school, the gifted pupils were randomly interspersed among the several heterogeneous classes at their grade level. There were approximately 5 underachievers identified in each of grades 2, 3, 4 and 5 at each of the two schools. During the following school year identification and screening procedures were repeated with all pupils completing the first grade. New subjects (N = 10) thus identified at both schools were added to the experimental (N = 5) and control (N = 5) groups. Data reported in this study were collected from all subjects who had been in the study a minimum of two years.

The subjects for this study, then, consisted of 25 underachieving gifted pupils placed in homogeneous classes with intellectually gifted pupils who were high achievers, and 23* underachieving gifted pupils placed in heterogeneous classes with pupils of varied intellectual ability. The subjects in the homogeneous classes were designated as group "E" ($N_E = 25$), and the contrasting subjects in the heterogeneous classes were designated as group "C" ($N_C = 23$).

A summary of the characteristics of the two groups of subjects is presented in tables 1 and 2.

*Two subjects moved from the community and thus were dropped from the study

Table 1

CHARACTERISTICS OF UNDERACHIEVING SUBJECTS

	Homogeneous (E)	Heterogeneous (C)	Statistical Significance of Difference Between Groups E and C
N	25	23	
N of Boys	19	14	$x^2 = .67$; $p = .40$
N of Girls	6	9	
Mean CA	11.0	11.0	$t = 0.00$; $p = .99$
Mean IQ	144.8	135.8	$t = 2.11$; $p = .04$
SD of CA	1.43	1.36	
SD of IQ	17.23	11.24	

The two groups, as shown in Table 1 did not differ significantly with respect to boy-girl ratio or chronological age. They did differ, however, with respect to measured intelligence ($p < .05$).

Table 2

FATHER'S OCCUPATION AS AN INDEX OF SOCIO-ECONOMIC STATUS

Class[a]	1	2	3	4	5	6 and 7
Homogeneous	12	5	4	2	2	0
Heterogeneous	6	5	2	3	6	0

[a]Classified according to Warner's Revised Scale for Rating Occupation (1949) Median test yields $x^2 = .95$; $p = .34$.

The two groups, as noted in Table 2, did not differ significantly with respect to socio-economic status as indicated by fathers' occupations ($p = .34$).

Procedure

Underachieving gifted pupils were identified in grades 2, 3, 4 and 5. Subjects in the experimental group ($N_E = 25$) were placed in classes in which all pupils were intellectually gifted, whereas subjects in the contrast group ($N_C = 23$) were placed randomly in classes made up of pupils of all degrees of intellectual ability. Both groups of subjects were taught by randomly-assigned regular teachers.

Instructional materials, curricular offerings and various types of services, such as those of the school consultant for gifted pupils, were made available equally to both schools participating in the study. The two groups of subjects differed only in that the subjects in group "E" were placed in homogeneous classes whose members had all been identified as intellectually gifted whereas the subjects in group "C" were placed in heterogeneous classes whose members had intellectual ability ranging from dull normal to gifted.

In the fall of 1959, measures of perceived parent attitudes, perceived peer relationships, and academic achievement were obtained from all subjects in grades 2, 3, 4 and 5. Thereafter, these measures were obtained from each new group of subjects entering the second grade. Post-tests of achievement were administered to all subjects in all grades at the end of each school year. In addition, post measures of perceived parent attitudes and perceived peer relationships were made in the spring of 1962. Creativity tests were administered initially to the fourth and fifth grade subjects the first year of the study and again when these subjects were in the sixth grade ($N_E = 10$; $N_C = 9$). Creativity tests were not administered to second and third grade subjects because of their limited ability to respond

in writing. Only data on subjects who had been in treatment for two years or longer were analyzed and included in this report.

Measuring Instruments

An appropriate level of the California Achievement Tests was used to determine the subjects' level of achievement in reading and arithmetic. Perceived parental attitudes were ascertained by the Perceived Parents Attitude Scale developed by Ausubel, Balthazar, Rosenthal, Blackman, Schpoont and Welkowitz (1954). The subjects' perceived peer acceptance was measured by the Perceived Peer Relationships Scale as described in a study of overachieving and underachieving gifted pupils carried out by the Champaign Schools (1961). Creative ability was evaluated by tests of creativity used by Wollersheim (1960). The tests of creative ability were entitled the Unusual Uses and the Consequences tests. A Fluency Score and a Flexibility Score are obtained from the Unusual Uses test and these two scores measure ideational fluency and spontaneous flexibility respectively. The Consequences test yields an Obvious Score which also measures ideational fluency and a Remote Score which is an index of originality. Thus, the three abilities of fluency, flexibility and originality which have been found to be involved in creative ability (Guilford, 1950) were sampled.

Chapter VI

STATISTICAL FINDINGS

(The interrelationships among the variables investigated in this study also could be controlled by subjecting the data to an analysis of covariance. When the influence of IQ measures was controlled by analysis of covariance, the differences between the two groups of subjects, with respect to the variables investigated, were in the same direction and degree as was observed in the more simple analysis of differences between net gain scores presented in this Chapter VI. The analysis of covariance indicated that the differences in the IQ of the two groups of subjects did not significantly influence the subjects' performance on the other measuring devices, and that the analysis of net gain scores makes an adequate allowance for the effects of the differences in the IQs of the subjects in the two groups. The low correlations found between measures of intelligence, creativity, perceived peer relationships and perceived parent attitudes may be a reflection of the fact that the subjects, as a group, were all of superior intellectual ability, or were "homogeneous" with respect to IQ. The results of the analysis of covariance are presented in the Appendix.)

The analysis of the differences between the two groups of subjects on the variables investigated was compounded by the unexpected finding that the subjects in the homogeneously grouped classes had a higher mean IQ than did the subjects in the heterogeneously grouped classes. In an attempt to correct for this bias, the groups were compared in terms of net gain scores obtained by subtracting initial (or pre-test) scores from final (or post-test) scores. This procedure seemed to reduce some

of the influence of the higher mean IQ of the subjects in the homogeneous group when compared to that of the subjects in the heterogeneous group. The correction does not allow for the fact that the subjects in the homogeneous group might be expected to make greater net gains because they had greater initial learning ability. This issue would be particularly relevant for those variables (academic achievement and creative ability) which are more directly related to measures of intelligence but possibly less relevant in the case of measures of perceived parental attitudes and perceived peer relationships.

Accordingly, the academic achievement manifested by the two groups of subjects was compared in terms of net gain in achievement discrepancy scores (see section on page 16), creative ability by differences in net gain scores, perceived parental attitudes by differences in net gain scores, and perceived peer relationships by differences in net gain scores. Since it was hypothesized that the subjects in the homogeneous group would manifest greater net gains when compared to the subjects in the heterogeneous groups, one-tailed values of significance were used in the interpretation of the statistical tests of the differences between the groups. As is customary, only those values which would occur by chance less than once in twenty times ($p = .05$) were considered as representing statistically significant differences. The data comparing the two groups of subjects following treatment are presented in Table 3, and they yielded the following information concerning the hypotheses investigated in this study.

Table 3

ANALYSIS OF DATA ON UNDERACHIEVERS IN REGULAR AND SPECIAL CLASSES[a]

	Homogeneous			Heterogeneous					
	Mean	S.D.	N	Mean	S.D.	N	F	t	p
Achievement Discp. Score	1.19	.78	25	.67	.89	23	1.30	2.17*	.02
Per. Par. Attitude Score	4.36	13.34	25	-3.5	20.43	22	2.35*	1.73*	.05
Per. Peer Rel. Score	- .76	9.17	25	-1.5	13.49	22	2.16	.21	.40
Creativity Scores									
Fluency	14.0	6.27	10	6.4	8.50	9	1.84	2.23*	.02
Flexibility	8.2	3.81	10	5.7	4.75	9	1.54	1.27	.11
Obvious	6.1	11.06	10	3.2	6.27	9	3.11	.70	.23
Remote	3.3	5.77	10	3.0	2.87	9	4.03*	.15	.42

* = $p < .05$

[a] Analysis involved gains obtained by contrasting pre-test and post-test measures.

Hypothesis 1: Achievement

It was hypothesized that intellectually gifted pupils enrolled in homogeneous classes would make greater gains relative to academic expectancy than underachieving intellectually gifted pupils enrolled in heterogeneous classes. Since the difference in gains in achievement between the gifted underachievers in homogeneous classes and gifted underachievers in heterogeneous classes was statistically significant ($p = .02$), this hypothesis was accepted.

Hypothesis 2: Creativity

It was hypothesized that intellectually gifted underachievers placed in homogeneous classes would manifest greater gains in creativity than intellectually gifted underachievers enrolled in heterogeneous classes. Although underachieving gifted pupils in homogeneous classes did manifest higher mean scores on all four creativity tests than did underachieving gifted pupils enrolled in heterogeneous classes, the differences reached statistical significance only in the area of the Fluency Score (Fluency, $p = < .05$; Obvious, $p = .23$; Remote, $p = .42$; Flexibility, $p = .11$). Thus, the hypothesis was given only partial confirmation by the data.

Hypothesis 3: Perceived Peer Acceptance

It was hypothesized that intellectually gifted underachievers placed in homogeneous classes would manifest greater gains in perceived peer acceptance than would underachieving intellectually gifted pupils placed in heterogeneous classes. This expectation was not substantiated ($p = .40$). Analysis of the data did not support the hypothesis and, in fact, both groups decreased in perceived peer acceptance.

Hypothesis 4: Perceived Parent Attitudes

It was hypothesized that underachieving intellectually gifted pupils placed in homogeneous classes would manifest greater gains in perceived acceptance and intrinsic valuation by their parents than would underachieving intellectually gifted pupils placed in heterogeneous classes.

The difference between the two groups was statistically significant ($p = .05$), so this hypothesis was accepted.

Chapter VII

DISCUSSION OF FINDINGS

Relationship Between Ability and Capacity for Making Use of Ability

The theoretical rationale for this investigation of the influence of placement in classrooms presenting varied degrees of stimulation upon the performance of underachieving intellectually gifted pupils has been taken from the evidence gained in studies of the effects of sensory and cultural deprivation (Goldfarb, 1945; Skodak and Skeels, 1949; and Kirk, 1958). These studies have found that experiences which provide optimal stimulation foster maximum development of learning ability whereas experiences which offer limited stimulation are conducive to minimal development of learning ability. Although these relationships have been consistently demonstrated, the specific means by which the influence of differential degrees of stimulation manifests itself is open to question. From one point of view, the performance of an individual is limited by the individual's ability *per se* and by the capacity which he has for making use of his ability. For example, the person whose degree of learning ability is that represented by an IQ of 33 is not likely to solve correctly a complex mathematical problem regardless of his persistence in working on the problem. On the other hand, a person whose IQ is 130 may be unable to solve the same complex problem simply because he is so lacking in self-confidence that he is fearful of failure and will not try.

This distinction between ability and capacity for making use of ability is one that is generally recognized in studies concerned with the performance of individuals, but the relationship between ability

and capacity for using ability is one of mutual reinforcement. The reciprocality of the relationship introduces a bias which is reflected in all investigations of human performance, and which ideally should be controlled in all psychological measuring devices. The procedures for obtaining measures of psychological attributes, however, must necessarily rely upon indirect measures of ability. The expression of the ability is actualized only by some mediation process. The performance of an individual is always influenced by the degree of self-confidence, aspirational strivings, physiological states, acquired attitudes, approaches to conflict situations, and such. The influence of these factors may be positive or negative.

The investigation of differences in psychological functioning is compounded by the reciprocal relationships between ability and capacity for making use of ability. The relationship between ability and capacity for making use of ability is such that, from a practical point of view, the distinction between ability and capacity for making use of ability may be of minor significance in predicting individual outcomes. This statement could be substantially true for psychological measures (IQ) obtained from adults or when making predictions regarding an individual taken from a group, all of whom have obtained about the same scores on a psychological measuring device. The distinction between ability and capacity for making use of ability may be a more useful one in predicting differential outcomes of children where development is still in process or in the case of individuals who obtain widely different scores on psychological measuring devices. In this study, it was expected that the changes produced would be in the subjects' capacity for making use of their superior learning ability rather than in the ability <u>per se</u>.

Relationship Between Measures of Ability and Capacity for Using Ability In This Study

In this study, scores obtained from individual administrations of the 1937 Stanford-Binet Intelligence Scale, Form L, were used as the basic measure of school learning ability of the subjects. This measuring scale is generally recognized as being the single most appropriate device for assessing the school learning ability of pre-adolescent pupils who come from middle or higher socio-economic levels (Anastasi, 1961). Although the subjects in the two groups were not paired on the basis of IQs, all subjects were of superior intellectual ability. Scores obtained from academic achievement tests and tests of creative ability were taken as the more direct evidence of the subjects' capacity for making use of their school learning ability. Measures of the subjects' perceived peer acceptance-rejection and perceived parental attitudes of acceptance-rejection and intrinsic-extrinsic valuation were considered as more remote indications of changes in the subjects' capacity for making use of their intellectual ability.

Academic Achievement of Subjects

It was expected that the academic achievement of the subjects in the homogeneous group would be higher than that of the subjects in the heterogeneous group since the subjects in the homogeneous group would have access to a greater concentration of stimulating ideas and interests and would be under more pressure to aspire to higher goals and standards than would the subjects in the heterogeneous group. Although the expectation that the subjects in the homogeneous classes would have higher academic achievement than would the subjects in the heterogeneous classes was confirmed, the interpretation of this finding was confounded by differences in initial measures made by subjects in the two groups.

Initially, the subjects in the homogeneous group had a higher mean achievement score (grade 4.4) than did the subjects in the heterogeneous group (grade 4.2). The difference between these mean achievement scores, however, was not statistically significant ($p = .74$). The initial data also indicated that the mean IQ of the subjects in the homogeneous group (145.7) was higher than the mean IQ of the subjects in the heterogeneous group (135.8). The difference between these mean IQs was statistically significant ($p < .05$) with the subjects in the homogeneous group having a significantly higher degree of learning ability. The differences between the IQs of the two groups of subjects could be controlled by an analysis of covariance, (see Appendix) or by analysis based on net gain scores. Although the subjects in the two groups did not differ significantly with respect to IQ at the start of the study (mean IQ for subjects in heterogeneous group = 140.4, mean IQ for subjects in homogeneous group = 132.5; $p = .14$), the addition of five subjects to each group resulted in statistically significant differences in IQ between the two groups included in this study.

The influences of the difference in the learning ability of the subjects in the two groups was expected to be the most pronounced with respect to comparisons of the academic achievement since IQ and achievement test scores are highly correlated. A procedure making use of achievement discrepancy score differences was used in an attempt to correct for the influence of learning ability in contributing to the academic achievement of the subjects in the two groups. When the difference in the learning ability of the subjects was so corrected, the mean achievement discrepancy score of the subjects in the homogeneous group (1.19) was nevertheless higher than that of the subjects in the

heterogeneous group (.67). The difference between the mean achievement discrepancy scores of the two groups of subjects was statistically significant ($p < .05$). Since a difference between the mean achievement discrepancy scores of this magnitude would occur less than once in fifty times as a result of purely chance factors, the finding of a higher academic achievement on the part of the subjects in the homogeneous group seems to reflect, with a high degree of probability, the influence of differences in the treatment afforded the two groups of subjects.

It is possible that the greater gains in achievement made by the subjects in the homogeneous group could have resulted from the higher intellectual ability of this group. The achievement gains of the two groups were compared, however, by net gains in achievement discrepancy scores, a procedure which allows for the gain in academic achievement according to achievement expected on the basis of individual learning ability. This procedure would seem to minimize the influence of differences in intellectual ability. (Also, see Appendix.)

The subjects in the homogeneously grouped classes were exposed to a greater concentration of ideas, concepts and interests, and they had to choose from the more uniformly high standards and goals for evaluating the adequacy of their performances. In contrast, the subjects in the heterogeneously grouped classes were exposed to a lesser concentration of ideas, concepts and interests, and they had a range of standards and goals extending from low average to high for evaluating the adequacy of their performances. The subjects in the homogeneous class groups then, may have been encouraged by the greater degree of stimulation in their class and may have been more highly motivated to make full use of their

learning ability in order to meet the high standards and goals prevailing in the class. On the other hand, the subjects in the heterogeneously grouped classes might have a lesser degree of stimulation available in their class and would have a wide range of performance from which to evaluage the adequacy of their achievement. These findings can be interpreted as being similar to the findings of Dreyer (1953) and Hochbaum (1953) who found that individuals will seek to change their level of performance to agree more with that of the group. This tendency has been found to be more evident in groups made up of persons of homogeneous abilities or opinions, however, than in groups made up of persons of varied ability or opinion (Festinger and Gerard, 1952; and Dreyer, 1953).

Creative Ability of Subjects in Homogeneous and Heterogeneous Groups

It was hypothesized that the subjects in the homogeneously grouped classes would manifest a higher degree of creative ability than would the subjects in the heterogeneously grouped classes. The degree of stimulation and incentive to achieve at a higher level which appeared to be greater in the homogeneously grouped classes than in the heterogeneously grouped classes would favor the subjects in the homogeneous classes making maximum use of their intellectual ability. The subjects in the heterogeneously grouped classes would be less motivated to make maximum use of the intellectual ability. Creative ability was measured by the subjects' performance in coping with types of problem situations. Although the investigation of the correlation between measures of creative ability and intellectual ability has resulted in a degree of controversy, the type of performance demanded by the test of creative ability in this study appeared to be such that the scores from the ability tests and measures of intelligence would be highly correlated.

The investigation of the relationship between measures of creative ability and intellectual ability has been reviewed by Taylor (1962). Measures of creative ability have been found to be positively related to measures of MA, CA, and IQ. Taylor (1962) reported that substantial positive correlations ranging from +.20 to .40 have been found between IQ and scores from creative ability tests obtained from unselected (heterogeneous) groups of subjects, whereas the correlations between these two measures is negligible, ranging from zero to low negative values, when scores made by selected (homogeneous) groups of subjects are correlated. In an investigation of factors associated with under and overachievement carried out by members of the Champaign Schools (1961), correlation coefficients ranging from +.226 to +.493 were found between IQs and scores from four creative ability measures obtained from a group of 20 underachieving academically gifted pupils in the elementary school grades. The difference in the findings of the study carried out by the Champaign Schools and those reported by Taylor may be due to the fact that high achieving gifted pupils are more readily identified for study than underachieving academically gifted pupils. Consequently, underachieving gifted pupils may have been omitted from the studies reviewed by Taylor. This possibility seems substantiated by the finding of correlations with the range suggested by Taylor (range of -.069 to +.068) for IQ and creative ability test scores obtained by 21 high achieving intellectually gifted pupils in the study carried out by staff members of the Champaign Schools (1961).

The demonstrated relationship between measures of intellectual and creative ability suggested the advisability of taking intellectual ability into account in this investigation of the creative ability

manifested by the subjects in the homogeneously and heterogeneously grouped classes. At the time that the initial measures of creative ability were obtained, the mean IQ of the subjects in the homogeneous group was 153.2 whereas the mean IQ of the subjects in the heterogeneous group was 133.2. Although the subjects in both groups were of superior intellectual ability, the subjects in the homogeneously grouped classes had a significantly higher degree of intellectual ability when compared to that of the subjects in the heterogeneously grouped classes ($p < .01$). As might be expected, the two groups also differed significantly with respect to initial measures of creative ability with but two exceptions. For the factor of Fluency the subjects in the homogeneous group had an initial mean score of 22.2 whereas the subjects in the heterogeneous group had an initial mean score of 19.1 ($p = .92$). For the factor of Flexibility, the subjects in the homogeneous group had an initial mean score of 16.9 and the subjects in the heterogeneous group had an initial mean score of 11.8 ($p < .05$). On the Obvious Score, which is also a measure of Fluency, the subjects in the homogeneous group had an initial mean score of 21.6 and the subjects in the heterogeneous group had an initial mean score of 19.7 ($p = .60$). In the case of the Remote Score, which is an index of Originality, the subjects in the homogeneous group had an initial mean score of 6.2 whereas the subjects in the heterogeneous group had an initial mean score of 2.0 ($p < .05$). Thus, the subjects in the homogeneous group initially had a higher degree of creative ability than did the subjects in the heterogeneous group, and the differences between the two groups were statistically significant for measures of Flexibility ($p < .05$) and Originality ($p < .05$). These differences in initial measures of creative ability might be attributable to the differences in intellectual ability evidenced by the subjects in the two groups. (See analysis of covariance in the Appendix.)

The relationship between IQ and creative ability test scores indicated the necessity for comparing the creative ability of the two groups of subjects by means of a procedure which would make allowances for the influence of the different degrees of intellectual ability evidenced by the two groups of subjects. Accordingly, the investigation of the differences between the creative ability of the subjects in the two groups made use of the changes evidenced in pre-test and post-test measures of creativity. The post-test measures were made after the subjects had been in treatment two years (placement in a homogeneously as compared to placement in a heterogeneously grouped class). The scores obtained in the initial testing were subtracted from the scores made on the post-tests and the resulting net gain scores were compared. The changes in creative ability, as reflected in these net gain scores, would more likely be indications of the influence of the differential treatment afforded the subjects in the two groups although it could still be said that the subjects in the homogeneous group could be expected to make greater gains in creative ability because they had a higher degree of intellectual ability.

As was hypothesized, the difference in the net gain score measures of creativity indicated that the subjects in the homogeneously grouped classes had gained a higher degree of creative ability than had the subjects in the heterogeneously grouped classes. On the factor of Fluency, the subjects in the homogeneous group had a mean difference score of 14.0 and the subjects in the heterogeneous group had a mean difference score of 6.4 ($p < .05$). With respect to the factor of Flexibility, the subjects in the homogeneous group had a mean difference score of 8.2 whereas the subjects in the heterogeneous group had a mean

difference score of 5.7 (p = .11). For the Obvious Score, which also measures Fluency, the subjects in the homogeneous group had a mean difference score of 6.1 whereas the subjects in the heterogeneous group had a mean difference score of 3.2 (p = .23); and for the Originality factor, represented by the Remote Score, the subjects in the homogeneous group had a mean difference score of 3.3 whereas the subjects in the heterogeneous group had a mean difference score of 3.0 (p = .42). The finding that the subjects in the homogeneous group had a higher net gain in creative ability factors than did the subjects in the heterogeneous group, with a statistically significant difference on the factor of Fluency, seems to reflect the more favorable influences accruing from placement in the homogeneously grouped classes. The subjects in the homogeneously grouped classes would have been exposed to a greater degree of stimulation and would have been more encouraged to make the maximum use of their intellectual ability in seeking to attain the higher standards and expectations of their classmates. The subjects in the heterogeneous group, on the other hand, would have encountered less stimulation and would have had lower standards to select from in setting their goals and aspirations. These differences were found despite the fact that the groups were small, a total of 19 subjects, and even though the subjects had only two years of differential treatment. It seems likely that a greater number of subjects may reveal even greater differences between the two groups.

Perceived Parental Attitudes of Subjects in Homogeneous and Heterogeneous Groups

It was hypothesized that the subjects in the homogeneous group, when compared to the subjects in the heterogeneous group, would see themselves

as more accepted and more intrinsically valued by their parents. The initial measures of perceived parental attitudes showed that the subjects in the heterogeneous group had a higher mean score (139.0) than did the subjects in the homogeneous group (136.4). Although the subjects in the heterogeneous group thus appeared to see themselves as more accepted and intrinsically valued by their parents than did the subjects in the homogeneous group, the difference between the two groups was not statistically significant ($p = .58$). After two years of treatment, however, measures of perceived parental attitudes revealed a mean net increase of +4.36 for the subjects in the homogeneous group whereas there was a mean net decrease of -3.5 for the subjects in the heterogeneous group. The difference between the mean net gain scores was statistically significant ($p = .05$), indicating the subjects in the homogeneous classes saw themselves as more accepted and intrinsically valued by their parents.

It must be recognized that the change in perceived parental attitudes could have been fostered by the parents of the subjects being made aware of the "intellectually gifted" nature of their children. Since parents of subjects in both the homogeneous and the heterogeneous groups were informed of this attribute of their children in the same way and at the same time, this explanation does not seem adequate for accounting for the observed differences in perceived parental attitudes. There is the possibility that the parents' perceptions of the pupils as "intellectually gifted" was differentially reinforced with respect to the two groups of subjects, however, since pupils in the homogeneous groups were placed in "special" classes, it is likely that this proved a topic of interest in parent-school centered activities and groups. The scope of this study did not provide specific measures relevant to this issue which appears to warrant additional investigation.

It has been found that a high degree of parental acceptance favors a high degree of school achievement whereas parental attitudes of rejection are conducive to poor school achievement (DiCarlo, 1958; Drews and Teahan, 1957). Since the relationship between parental attitudes and school achievement is a mutually reciprocal one, it would appear that the higher achievement attained by the subjects in the homogeneously grouped classes, as compared to the achievement of the subjects in the heterogeneously grouped classes may have fostered improved parent-child relationships. The success gained in school achievement may have acted to instill a greater degree of self-confidence and personal adequacy in other situations, including parent-child relationships, on the part of those subjects in the homogeneous group. The higher school achievement of the pupils in the homogeneous group might also serve to reassure the parents of these subjects as to the inherent worthiness and adequacy of these pupils.

Perceived Peer Relationships of Subjects in Homogeneous and Heterogeneous Groups

Although perceived peer relationships, as with perceived parental relationships, were conceptualized within the framework of this study as being more indirectly related to changes in capacity for making use of intellectual ability, it was hypothesized that the subjects in the homogeneous group would see themselves as more accepted by their classmates after treatment and when compared with the subjects in the heterogeneous group. This hypothesis grew out of the expectation that the subjects in the homogeneous group would be more likely to attain a higher degree of academic achievement and the associated successes in meeting

goals and standards held by their classmates would propituously influence these pupils' perceptions of being accepted by their peers. It has also been demonstrated that identification, recognition and acceptance by others is facilitated more when the members of a group are of comparable ability (Festinger, 1954). Looking at the other side of the picture, the expected inability of the subjects in the heterogeneous group to attain a high degree of academic achievement might adversely influence the pupils' efforts to find acceptance from their classmates. The gaining of a high degree of status, recognition and approval from his classmates would also be more difficult for subjects in the heterogeneous group because of the instability and uncertainty which colors group cohesiveness, according to Festinger (1954), when there is a wide range of choise for comparing or evaluating one's performance.

In the initial measures of perceived peer acceptance, it was found that the subjects in the homogeneous group had a slightly higher degree of perceived peer acceptance (mean = 119.9) than did the subjects in the heterogeneous group (mean = 113.5). This initial difference between the mean perceived peer acceptance scores was not statistically significant ($p = .08$). Contrary to the expected change, the net gains in perceived peer acceptance after two years of treatment were in a negative direction for both groups. The mean net gain for the subjects in the homogeneous group was -.76 and the mean net gain in perceived peer acceptance for the subjects in the heterogeneous group was -1.5. The difference between the mean net gain scores of the two groups of subjects was not statistically significant ($p = .40$). Although the

loss in perceived peer acceptance was less for those subjects in the homogeneous than for those subjects in the heterogeneous group, the failure of the subjects in the homogeneous group to manifest a higher degree of perceived peer acceptance, especially in the light of their having a higher degree of academic achievement, is puzzling. The finding that the subjects in both groups evidenced a drop in degree of perceived peer acceptance, however, may not be too surprising in view of the low degree of peer acceptance which seems to characterize underachievers as a group.

In a study of factors associated with under and over achievement of gifted pupils, carried out by the Champaign Schools (1961), it was found that underachievers, as a group, have a significantly lower degree of perceived peer acceptance. Gallagher (1958) found that the social relationships of gifted pupils in the elementary grades appears to be more a reflection of physical proximity, neighbors choose neighbors as friends, rather than evidence of other forms of social interaction. The findings reported in these two studies suggest that the failure to find differences in the perceived peer relationships of the subjects may be attributed to the extreme degree of peer rejection which seems to be directed generally toward underachievers. It is also possible that underachievers, as a group, are immature developmentally and thus have a greater tendency to be retarded in the area of acquiring appropriate social skills for making friends.

The data obtained in this study do not support the expectation that underachieving gifted pupils will have a higher degree of perceived peer acceptance after a minimum of two years of placement in a homogeneous class and when compared to a group of underachieving gifted pupils in a

heterogeneous class. Although it was not possible to verify the hypothesis regarding perceived peer acceptance at this stage of the study, it is possible that significant differences in perceived peer relationships may become manifest after a longer treatment period. Although neither group made gains with respect to perceived peer acceptance, it is reassuring to note that gifted underachievers placed in homogeneous classes are able to achieve more academically without sacrificing appreciably their social status.

Representativeness of Findings

This study has compared the influence of placement in homogeneously grouped and heterogeneously grouped classes upon the academic achievement, creative ability, perceived parental attitudes, and perceived peer relationships of two groups of underachieving, academically gifted, elementary school pupils. The subjects were identified on the basis of discrepancy between achievement test scores and level of expected achievement as ascertained by individually administered intelligence test scores. The tendency of the subjects to remain in the same relative position when ranked with the other members of their class repeatedly and over an extended period of time suggests that the academic underachiever represents a consistent personality manifestation which is not an artifact of errors inherent in psycho-educational measuring devices. The measuring instruments were carefully pre-tested and had a sufficient degree of test-retest reliability to warrant their use in this investigation of differences between two groups of subjects. The subjects were of superior intellectual ability and came from higher white socio-economic home backgrounds. The two groups did not differ significantly as to boy-girl ratio.

The finding that placement in homogeneously grouped classes is conducive to higher academic achievement, and higher creative ability is confounded by the fact that the subjects in the homogeneously grouped classes had a higher degree of intellectual ability. The association of special class placement with a higher degree of perceived parental acceptance and intrinsic evaluation may apply only to intellectually gifted underachievers from higher soci-economic levels where educational achievement is highly valued. The influence of such treatment upon perceived peer acceptance is not clear. The extension of the findings obtained in this study is limited by the higher degree of intellectual ability observed in the subjects in the homogeneously grouped classes. This suggests that the findings obtained in this study should be given only tentative acceptance pending the outcomes to be found at the termination of the study.

Chapter VIII

SUMMARY AND IMPLICATIONS

Problem

This research was concerned with investigating the level of achievement of intellectually gifted underachieving pupils in the elementary school. Specifically this study investigated the efficacy of two administrative plans relative to influencing the achievement of intellectually gifted underachievers. One approach was that of placing a small segment of underachievers in homogeneous classes with high achievers; the other approach was that of placing intellectually gifted children in heterogeneous classes made up of children with a wide range of intellectual abilities. It was hypothesized that placing underachievers in a homogeneous class with high achievers would stimulate the underachievers to raise their level of achievement, become more creative, and perceive their peers and parents as being more accepting of them.

Organization of Study

Intellectually gifted subjects in grades two through five were selected from two large elementary schools. Following preliminary screening procedures using teacher referrals, group achievement and intelligence tests, and the vocabulary scale of the 1937 Stanford-Binet, 465 children were administered the 1937 Stanford-Binet. A total of 223 pupils obtained an intelligence quotient of 120 or above and thus met the criterion for potential subjects to be included in the study. Achievement grade expectancies in reading and arithmetic as determined by the Horn formulas (1941) were compared with corresponding achievement test scores. Pupils whose averaged achievement discrepancies deviated

-1 SD or more from the mean of their group were designated as underachievers. Approximately five underachievers were placed in homogeneous classes at grade levels 2, 3, 4 and 5 with high achieving gifted children and were designated as experimental group "E". A control group "C" consisted of five underachievers at the same grade levels placed in heterogeneous classes with children of varying intellectual levels.

The following year five additional subjects were added to both the experimental and control groups. Only underachieving subjects who had received treatment for a period of from two to three years were included in the analysis of the data ($N_E = 25$; $N_C = 23$)*.

Measuring Devices

The subjects' level of achievement in reading and arithmetic were measured by an appropriate level of the California Achievement Tests. A measure of the child's perception of parental attitudes was obtained by administering the Perceived Parent Attitude Scale (Ausubel, 1954). Items from the California Test of Personality were used to evaluate the subjects' perception of peer acceptance. Creative ability was measured by two tests adapted from Guilford (1950) by Wollersheim (1960).

After careful consideration of the underlying rationale of this study, scores yielded by measuring instruments were analyzed by appropriate methods to determine the statistical significance of differences between the experimental and control groups. A .05 level of significance was used in interpreting statistical differences between scores.

*Two subjects moved from the community and did not meet the criterion of two years or more of treatment in the program.

Results

Hypothesis 1: Achievement

It was hypothesized that the achievement of underachieving intellectually gifted pupils enrolled in homogeneous classes would make greater academic gains relative to expectancy than would the underachieving intellectually gifted pupils enrolled in heterogeneous classes. This expectation was confirmed. The difference in achievement between the gifted underachievers in homogeneous classes and the gifted underachievers in heterogeneous classes reached statistical significance ($p = .02$). Thus, underachieving gifted pupils placed in homogeneous classes made significantly greater gains in approaching their expected level of academic performance in reading and arithmetic than did underachieving gifted pupils placed in heterogeneous classes.

Hypothesis 2: Creativity

It was predicted that underachievers placed in homogeneous classes would make higher gains in creativity than would underachievers enrolled in heterogeneous classes. Although the mean scores on all four creativity tests were in the predicted direction, only one of the four measures of creativity (Fluency, $p < .05$) reached statistical significance. Thus, the expectation that underachievers enrolled in homogeneous classes would make higher gains in creativity than underachievers in regular classes was only partially supported by these findings.

Hypothesis 3: Perceived Peer Acceptance

It was predicted that underachieving intellectually gifted pupils placed in homogeneous classes would manifest greater gains in perceived

peer acceptance than would underachieving intellectually gifted pupils placed in heterogeneous classes. This expectation was not substantiated by the findings ($p = .40$). Thus, the analysis of the data did not support the hypothesis.

Hypothesis 4: Perceived Parent Attitudes

It was hypothesized that underachieving gifted pupils placed in homogeneous classes would manifest greater gains in perceived parental acceptance and intrinsic valuation by their parents than would underachieving gifted pupils placed in heterogeneous classes. The differences between the two groups were statistically significant ($p = .05$) in the predicted direction. The data confirmed the hypothesis.

Implications

The findings of this study suggest that one administrative plan of fostering improved academic achievement among the intellectually gifted underachievers is to place them in homogeneous classes with high achievers. This educational setting appears to stimulate the underachievers to perform academically at an improved level. This study further suggests that when underachievers are placed in a homogeneous class, and their achievement is accelerated, the underachieving child perceives his parents attitudes toward him as being more favorable. The stimulation of being with high achievers in homogeneous classes appears also to foster greater fluency of ideas among underachievers.

Since underachievers placed in homogeneous classes with high achieving intellectually gifted pupils achieve at a higher level,

perceive themselves as being more favorably accepted by their parents and more intrinsically valued by them, and in the area of creativity are more fluent, it is suggested that the public schools give consideration to the following:

- Early identification of the underachievers at the elementary levels, as early as the first grade, and placement of these underachievers in homogeneous classes with high achievers seems to be desirable. Identification of underachievers poses difficult problems which necessitate the specialized services of psychologists and consultants for the gifted. A well developed screening program is needed to identify the intellectually gifted who are achieving; even more precise procedures for identifying the underachievers at a young age are needed.

- The complex problems of the underachieving intellectually gifted would suggest the need for a well developed in-service training program for administrators and teachers. This program should foster an improved understanding of the problems and needs of underachievers and enable them to assist more effectively in the identification and treatment of underachievers.

- Since creativity is associated with academic achievement and since the underachievers in homogeneous classes were found to be more fluent after two or more years in homogeneous classes, it is suggested that creativity among underachievers may be fostered by placing these children with others of like intellectual potential and high achievement. Teachers should be aware of the high positive relationship between creativity and achievement, and thus encourage and reward creative expression.

- It is suggested that the school can modify parental attitudes which are related to academic achievement by placing underachieving gifted in homogeneous classes of achieving gifted. Presumably parental attitudes of members of the upper middle socio-economic levels can be changed when such parents are repeatedly made aware of the worth of the child by special class placement.

Need for Further Research

Administrative Plans

This study investigated only two administrative plans for fostering improved achievement of the intellectually gifted underachievers at the elementary level. One plan was that of placing a small number of underachievers in homogeneous classes with high achievers and the other that of placing underachieving intellectually gifted in heterogeneous classes with children of various intellectual levels. The extent to which the following administrative plans can facilitate improved achievement among the gifted who are underachievers should be investigated:

- Grouping underachievers together in a homogeneous class made up of only underachievers.

- Grouping of underachievers in homogeneous classes for only a portion of a day with the remainder of the time spent in heterogeneous classes.

- Grouping of underachieving gifted in homogeneous classes with high achievers for only a portion of the day and the remainder of the time grouping them together for instructional purposes in a class made up of only underachievers.

- Enrollment of underachievers in special classes made up predominantly of high achieving gifted pupils and in addition provide the underachievers with special individual help from a special teacher for a portion of each day.

- Homogeneous classes made up of underachieving gifted pupils and in addition providing special individual help for each underachieving pupil in his areas of specific weakness for a period of each day.

- Interest groups designed to foster creativity either during school hours or after school for the underachieving gifted.

- Grouping underachieving gifted pupils with high achieving gifted pupils of low socio-economic levels or subcultural groups.

In addition to testing the above administrative plans, the following research closely related to these problems should also be studied:

- The optimum number of intellectually gifted underachievers that should be profitably placed with high achieving intellectually gifted pupils.

- To ascertain the extent to which placement of underachievers in a homogeneous class affects the aspiration level, work habits, interests, vocational goals, self concept, and attitude toward authority figures.

- More specifically delineating the types of underachievers who respond to the administrative plan of grouping underachievers with high achieving gifted pupils.

- Replication of this study with large numbers of underachieving gifted children at both the elementary and secondary levels.

- Effect upon achievement of non-gifted children when gifted children are removed from their classes.

Teachers

This study made no attempt to evaluate the part the teacher played in this study. Teachers were selected randomly. It is suggested, however, that the teacher variable might play an important role. The following research problems are suggested:

- The extent to which the achievement of underachievers placed in homogeneous classes with high achievers is influenced by teachers with special training in the area of the gifted.

- The relationship between the degree of acceptance of the underachieving child by the teacher as related to academic achievement.

- The extent to which the achievement of the underachieving gifted is influenced by the sex of the teacher.

Methods and Techniques

The variables of method of instruction lends itself to such researchable problems as the following:

- The extent to which specific methods and techniques can facilitate improved achievement and creativity among underachievers using various administrative plans needs to be studied.

- The extent to which in-service training programs can bring about improved methods and techniques for teaching the gifted to prevent underachievement of this segment of the school population.

- The effectiveness of specific methods and techniques of teaching in fostering improved work habits, interests, social relationships, self concept, attitude toward peers, and motivation to achieve.

Special Services

Certain special services in combination with administrative plans or singularly such as the following may have sufficient merit to study on a research basis:

- The extent to which the achievement of the underachiever from higher socio-economic levels who are placed in homogeneous classes can be fostered to a greater extent by involving the parents of these children and the children themselves in group and individual counseling. This service would seem to be especially important for those underachievers who have impaired parental relationships.

- The effectiveness of group and individual counseling of parents of low socio-economic levels who have gifted children not working at an academic level commensurate with their potentials.

- The extent to which a differential diagnosis of underachieving gifted pupils can lead to an improved educational program to meet the specific needs, interests, and talents of the underachieving gifted.

Materials of Instruction

With the wealth of teaching materials now available to schools, it would seem advisable to study problems closely related to providing the gifted underachiever with adequate materials to stimulate him to raise his level of achievement. The following problems are suggested:

- A determination and evaluation of materials of instruction that are necessary to promote optimum development of the intellectually gifted and alleviate and/or reduce underachievement such as programmed text materials or teaching machines, simulated situations and materials which would require critical and divergent thinking in finding solutions to problems.

- The extent to which materials of instruction can be selected to meet the individual needs of pupils and reduce underachievement when a consultant is employed to assist teachers in improving their educational offerings to the gifted.

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APPENDIX

Data contained in this appendix were included to clarify the relationships between differences in the mean IQs of the subjects in the two groups (experimental and control) and other measured variables. Although the two groups differed with regard to mean IQ, analyses of covariance indicated that IQ and other variables were not related to any appreciable degree. Consequently, the findings included in the basic report can be accepted without reservations pertaining to the part played by the differences in intelligence in accounting for differences in other variables investigated in this study.

DIFFERENCES BETWEEN PRE-TESTS AND POST-TESTS OF ACADEMIC ACHIEVEMENT
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	$ss_{Ach.}$	$ss'_{Ach.}$	d.f.	$ms'_{Ach.}$	F
Between Gps.	1	964.7	78.7	6.42	6.34	1	6.34	3.43*
Within Gps.	46	10,323.3	-33.1	85.37	85.27	46	1.85	
Total	47	11,288.0	45.6	91.79	91.61	47		

[a]See $H:B_w = 0$

$H : \beta_1 = \beta_2$ yielded F = .006 which was not significant and hence indicated that the relationship between IQ and achievement was the same in both groups.

$H : \beta_w = 0$ yielded F = .05 which indicated that there was no relationship between achievement and IQ in the groups under consideration.

$H : s^2_{Exp.} = s^2_{Cont.}$ yielded F = 1.15 which indicated that there was no significant difference in the variances of the achievement test scores obtained by the subjects in the two groups.

Although no relationship was found between achievement and IQ, a complete analysis of covarience was made for demonstration purposes. The result (F = 3.43) was significant at the .03 level when a 1 tailed hypothesis ($M_{Exp.} > M_{Cont.}$) was made. This finding supported the findings reported in the body of this report.

DIFFERENCES BETWEEN PRE-TESTS AND POST-TESTS OF PERCIEVED PEER RELATIONSHIPS
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	ss_{Peer}	d.f.[a]	ms_{Peer}[a]	F[a]
Between Gps.	1	20,351	82	6	1	6	.05
Within Gps.	45	10,142	-328	5,842	45	130	
Total	46	30,493	-246	5,848	46		

(a - See H : $\beta_w = 0$)

H : $\beta_1 = \beta_2$ yielded F = .31 which indicated that the relationship between IQ and changes in Perceived Peer Relationships were similar within both subgroups.

H : $\beta_w = 0$ yielded F = .09 which indicated that there was no significant relationships between IQ and changes in Perceived Peer Relationships. Consequently, differences among IQs were disregarded and an analysis of variance was made of the uncorrected s.s. The results of the analysis of variance, indicated in columns marked a, were not significant and hence supported the findings indicated in the body of this report.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 1.11 which indicated the variances in the experimental and control variance groups associated with changes in Perceived Peer Acceptance were not significantly different. The analysis of variance was thus considered to be an appropriate statistical technique.

DIFFERENCES BETWEEN PRE-TESTS AND POST-TESTS OF PERCEIVED PARENT ATTITUDE
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	ss_{Parent}	d.f.[a]	$ms_{Ach.}$[a]	F[a]
Between Gps.	1	1,072.3	881.2	722.9	1	722.9	2.50 ($p = .11$)
Within Gps.	45	10,142	60.8	13,039.3	45	289.7	
Total	46	11,214.3	942.0	13,762.2	46		

(a - See H : $\beta_w = 0$)

H : $\beta_1 = \beta_2$ yielded F = .01 which was not significant and indicated that the relationship between the Perceived Parent Attitudes and IQ was similar in both groups.

H : $\beta_w = 0$ yielded F = .001 which indicated that there was no relationship between IQ and Perceived Parent Attitude. Consequently, an analysis of variance was made without correcting the ss_{Parent}. The results of the analysis of variance are indicated in columns $ms_{Ach.}$ and F.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 2.35 which was significant at the .05 level. This difference violated the assumption of homogeneity of variance and hence must be considered in evaluating the differences between the two groups with respect to the variable. The results of the t test, in which a correction was made for the difference in variance, were significant at the .05 level and may be considered to provide a more adequate test of this H:.

DIFFERENCES BETWEEN PRE-TESTS AND POST-TESTS OF FLUENCY
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	$ss_{Fluency}$	d.f.[a]	$ms_{Fluency}$	F[a]
Between Gps.	1	1,480.2	632.8	270.4	1	270.4	4.93*
Within Gps.	17	3,070.5	141.0	932.2	17	54.8	
Total	18	4,550.7	773.8	1,202.6	18		

H : $\beta_1 = \beta_2$ yielded F = 3.58 which was not significant at the .05 level and indicated that the relationship between IQ and Fluency was similar in both groups.

H : $\beta_w = 0$ yielded F = .10 which indicated that there was no significant relationship between IQ and Fluency. Consequently, an analysis of variance was conducted which did not attempt to correct for the minimal relationship between IQ and creativity. The results are indicated in the $ms_{Fluency}$ and F columns.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 1.84 which was not significant and indicates that an analysis of variance was appropriate.

*
The analysis of variance indicated that there was a significant difference between the two groups with regard to fluency of thought. This finding was directly comparable to the t test cited in the body of this report which, of course, was significant.

DIFFERENCES BETWEEN PRE-TESTS AND POST-TESTS OF FLEXIBILITY
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	$ss_{Flex.}$	d.f.[a]	$ms_{Flex.}$[a]	F[a]
Between Gps.	1	1,480	203	27	1	27	1.50
Within Gps.	17	3,071	137	314	17	18	
Total	18	4,551	340	341	18		

(a - See H : $B_w = 0$)

H : $\beta_1 = \beta_2$ yielded F = .013 which indicated that the relationship between IQ and Flexibility was similar in both groups.

H : $\beta_w = 0$ yielded F = .30 which was not significant and hence indicated that there was no appreciable relationship between IQ and Flexibility in the groups under consideration. Consequently, an analysis of variance was made of differences in Flexibility without considering the effects of IQ. The results of the analysés of variance are reported in columns $ms_{Flex.}$ and F.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 1.54 which indicated the groups are not significantly different with regard to the variability of the Flexibility scores.

The analysis of variance indicated no significant difference in Flexibility between the groups which, of course, was the finding of the t test cited in the body of this report.

DIFFERENCES BETWEEN PRE-TEST AND POST-TEST OBVIOUS SCORES
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	$ss_{Obvious}$	d.f.	$ms_{Obvious}$ [a]	F [a]
Between Gps.	1	1,480	251	39	1	39	.42
Within Gps.	17	3,071	-810	1,577	17	93	
Total	18	4,551	-559	1,616	18		

(a - See H : $\beta_w = 0$)

H : $\beta_1 = \beta_2$ yielded F = .12 which indicated the relationship between IQ and Obvious scores was similar in the two groups.

H : $\beta_w = 0$ yielded F = 2.31 which was not significant and indicated that there was no significant relationship between IQ and Obvious scores in the groups under consideration. Consequently, an analysis of variance was made without considering the effect of differences in IQ. The results of the analyses of variance are reported in columns $ms_{Obvious}$ and F. Since the F = 2.31 approached significance, hence may have led to a Type II error, an analysis of the "adjusted" ms was also made. The resultant F = 2.02 $\left|\text{d.f.} = 1/16\right|$, based on the "adjusted" m.s., would be considered significant at the .09 level.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 3.11 which approached significance at the .05 level and suggested that the analyses of variance be viewed with caution. Consequently, the findings of the analysis supported the findings indicated in the body of this report.

DIFFERENCES BETWEEN PRE-TEST AND POST-TEST REMOTE SCORES
WHEN DIFFERENCES IN IQ ARE CONSIDERED

Sources	d.f.	ss_{IQ}	ss_{XY}	ss_{Remote}	d.f.[a]	ms_{Remote}[a]	F[a]
Between Gps.	1	14,802	25.1	.5	1	.5	.02
Within Gps.	17	3,070.5	-33.7	336.1	17	21.5	
Total	18	4,550.7	- 8.6	336.6	18		

(a - See H : $\beta_W = 0$)

H : $\beta_1 = \beta_2$ yielded F = .16 which was not significant and hence indicated that the relationship between IQ and Remote scores were similar in both groups.

H : $\beta_W = 0$ yielded F = .01 which was not significant and hence indicated that there was no relationship between IQ and Remote scores in the two groups. Since there was no relationship, an analysis of variance was made of differences between the groups without considering the effects of differences in IQ. The results (F = .02) indicated that the groups did not differ significantly on this variable.

H : $s^2_{Exp.} = s^2_{Cont.}$ yielded F = 4.03 which indicated that the groups were different with regard to within group variability. Consequently, the t test cited in the body of the report was considered to provide a better test of the basic H: because it made some provision for difference in the variance of the sample populations. Both methods of analysis found no differences between the means of the groups.